

# Design and validation of an electronic teaching case on critical thinking

## *Diseño y validación de un caso de enseñanza electrónico sobre pensamiento crítico*

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### ABSTRACT

#### Keywords

e-case; teaching case; critical thinking; couple violence; high school students

Based on the teaching case methodology, a case was designed and validated in an electronic format (*e-case*), about critical thinking in relation to violence in the teenage couples. The design considers a situation-problem in the form of narrative, exposed to the high school students, who through a series of questions and activities proceed to the analysis, take a position and propose solutions. The *e-case* was carried out on HTML5 using WIX.com, and contains the following entries: introduction, characters, story, questions, activities, evaluation and contact. This article reports the techno-pedagogical design and the validation by experts and with the target population. The results were favorable and coincident regarding the content, didactic treatment and design of the website. Likewise, guidelines are provided for the design of an *e-case* and validation model for those who wish to get involved in this strategy.

### RESUMEN

#### Palabras clave

e-caso; caso de enseñanza; pensamiento crítico; violencia en la pareja; estudiantes de bachillerato

*A partir de la metodología de casos de enseñanza se diseñó y validó un caso en formato electrónico (e-caso) sobre pensamiento crítico respecto a la violencia en la pareja adolescente. El diseño considera una situación-problema en forma de narrativa, expuesta al estudiantado de bachillerato, quienes a través de una serie de preguntas y actividades proceden al análisis, toma de postura y propuesta de soluciones. El e-caso se realizó en HTML5 por medio de WIX.com, y contiene las siguientes entradas: introducción, personajes, historia, preguntas, actividades, evaluación y contacto. En este artículo se reporta el diseño tecnopedagógico, la validación con expertos y con población meta. Los resultados fueron favorables y coincidentes respecto al contenido, tratamiento didáctico y diseño del sitio web. Asimismo, se aportan pautas para el diseño de un e-caso y un modelo de validación para quienes desean involucrarse en esta estrategia.*

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## INTRODUCTION

With the incorporation of information and communication technologies (ICT), the field of teaching case design has been particularly favored due to the possibility of generating virtual environments enriched with digitized information, multimedia, links and evidence that provide greater realism and allow for better documentation of the situation that arises in them.

Teaching cases that have incorporated ICTs, called *e-cases* (Coll and Monereo, 2011; Díaz Barriga, 2006), enhance analysis and reflection, as well as people's agency, without forgetting the generation of solutions (Coll, Mauri and Onrubia, 2011). In education, questioning and judgment strategies have had favorable results in the promotion of critical thinking. Didactic work with cases is one of the strategies that promotes questioning about controversial real-life issues that require in-depth analysis through the recognition of different perspectives and possible biases.

Based on the specialized review of teaching case design (Wassermann, 1994; Díaz Barriga, 2006; Wurdinger and Carlson, 2010; Coll, Mauri and Onrubia, 2011; Naumes and Naumes, 2015), the key elements and the proposed didactic approach were considered. In this sense, the purpose of this article is to give an account of the technopedagogical design process of an *e-case*, as well as the model and the validation process of this with experts and with the target population. This *e-case* focuses on the study of critical thinking regarding violence in intimate partner relationships and is aimed at high school students.

### *e-case*

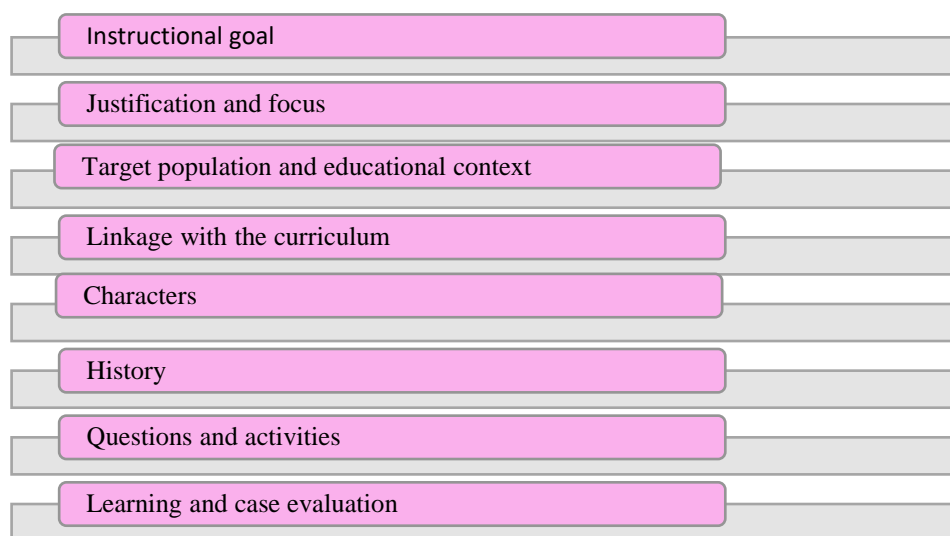
In teaching cases, students actively participate in the analysis of a set of facts that refer to situations or problems that occur in reality, in order to discuss their causes, foresee their consequences and propose possible solutions. This is done with the purpose of applying the skills and knowledge derived from the reflection and personal and group conclusions to their personal life, profession or studies (Mendoza, 2003, p. 17).

The proposals of teaching cases have not escaped the general trend of incorporating ICTs progressively to the teaching-learning processes; in particular, to transfer them to completely virtual or hybrid environments (Coll and Monereo, 2011, p. 219). These technology-mediated teaching cases are called *e-cases*.

The writing of an *e-case* for educational purposes requires recreating a social scenario on a par with an educational environment that invites readers to identify with it, which favors its analysis, as well as the inquiry about their beliefs and positions. In addition, it focuses on a story that contains a dilemma, which allows analytical, reflective and generative

processes, and poses a series of significant events and well-delineated characters (Díaz Barriga and Heredia, 2015).

According to Wasserman (1994), the following elements are considered in the design of a teaching case (see Figure 1). A primordial phase in the design of teaching cases -and little made explicit in these- is the validation process to which they are subjected. In this phase, other readers can identify elements of the case that are unclear, or enrich them through their experience (Naumes and Naumes, 2015, p. 157). Expert readers who validate an *e-case* should inform themselves about its objective and the questions to be elucidated in it. As this is a highly relevant phase, in terms of content validity and feasibility of a technopedagogical design proposal, the design and validation of an *e-case* that outlines an instructional path on critical thinking around a situation-problem close to the experiences of an adolescent population is presented here.



**Figure 1.** Elements of the teaching case.

Fuente: own elaboration based on Wasserman (1994).

### Critical thinking

We agree with Elder and Paul (2001) that critical thinking cannot be restricted to a rational ability that presides over action, since it always operates a system of beliefs (points of view, frames of reference and worldviews) that the person has built in his cultural context according to his circumstances, which shapes not only his point of view, but also the roles he assumes.

This thinking is characterized by questioning and problematizing any truth or knowledge that, without a previous critical and contextualized judgment, pretends to set itself up as unique, definitive and absolute; it is guided by inquiry and analysis, aimed at problem solving (Miranda, 2003).

According to Creamer (2011), the didactics of critical thinking implies active and relevant learning where meanings are constructed through interaction and dialogue to develop curiosity, questioning, reflection and the use of knowledge in order to make decisions and offer solutions. Likewise, Vendrell and Rodriguez (2020) indicate that critical thinking should be taken up again in the educational environment, where it is understood as a tool for liberation instead of domestication of students.

The critical thinking perspective from which we start here opts for the relevance of placing the student in a scenario where he/she must analyze and evaluate a complex and situated problem-situation, which occurs frequently to his/her age group in the context where he/she develops and will have to deploy analytical and evaluative skills, in addition to elucidate regarding his/her own position and belief system before an open and multidetermined issue.

## METHODOLOGY

### Objective

To design a teaching case in electronic format (*e-case*) on critical thinking in relation to intimate partner violence and validate it through experts and high school students.

### Stages

The study consists of three stages: design of the *e-case*, validation by experts of the *e-case* and validation with its target population.

### Instruments

Two formats were designed for the validation with experts, one in relation to the content of the case in didactic terms based on the case methodology and in relation to the critical thinking approach. The second in terms of the technopedagogical design of the web site hosting the case. The validation formats consider the dimensions and the scores to be assigned through a Likert-type scale (1 = does not meet the criterion, 2 = low level, 3 = moderate level and 4 = high level). The scores obtained show the Content Validity Radius (CVR), which indicates the proportion of agreements by experts at the highest level (Tristán, 2008).

For validation with the target population, a dichotomous response questionnaire was designed that considers the content, objective and usability of the *e-case*.

### Participants

Eight judges participated in the validation of the case content, four of whom are PhDs in educational psychology, two are PhDs in pedagogy and two are teachers in pedagogy. The six PhDs have experience in the area of critical thinking, five of them have experience in design and technopedagogical management and have worked with teaching cases; in addition, one of them has experience in gender perspective. The two teachers of pedagogy have experience in the design and management of teaching cases, and one of them is an expert in gender perspective. All eight judges have worked with high school students.

Eight judges participated in the validation of the web site, of which three are PhDs in Educational Psychology, two are PhDs in Pedagogy, a master in Pedagogy, a master in Computer Systems and a graduate in Computer Science, all with experience in the design and management of technological-pedagogical cases, as well as in working with high school students.

For validation with the target population, we proceeded with a group of fifteen students in their fourth semester of high school, of which six were male and nine were female, between 15 and 16 years of age, from a public school in the south of Mexico City.

### Preparation of the *e-case*

The instructional design models of the University of California at Santa Barbara (2002), the *e-cases* developed in the Research Group on Teaching, Educational Design and ICT (GIDDET, 2018) and the prescriptions of Wasserman (1994) were taken into account, with which the *e-case* of this study was designed.

The linkage of this *e-case* with the curriculum is located in the first and fourth semester, in the subject of Orientation I and II, whose study programs seek to promote critical thinking and for students to develop their life project, which requires a contextual approach to the reality in which they live.

The teaching case: Does it hurt more to have you than to let you go, focuses its plot on the characters Zoe and Andrik, two teenagers immersed in a couple relationship with violent overtones who face a dilemma. This case allows readers to analyze and reflect on what is related in the concrete situation, as well as to go beyond it to understand possible causes and consequences that give rise to and surround violence in relationships.

With respect to the technopedagogical design, a WIX HTML5 website was built to host the teaching case and organize the set of activities, as well as the multimedia materials and support links. The WIX platform allows cloud-based web development in order to create customized electronic sites; the site is freely accessible and the link to the *e-case* is as follows: <https://marialuisamoralesb.wixsite.com/caso> (see Figure 2).



**Figure 2.** Home page of the WIX site hosting the teaching case.  
Source: <https://marialuisamoralesb.wixsite.com/caso>

The site is structured with the following entries: welcome, activities, history, characters, evaluation, complementary material and contact (see Table 1).

**Table 1.** Sections of the web site with the *e-case* of teaching

Entries	Contents	Educational sense
Welcome	Digital infographic about what is a teaching case Site navigation video	Expose the purpose of the <i>e-case</i> , show a support guide for conducting the case and navigating on the site
Activities	Each session considers activities that revolve around questions of analysis, evaluation, taking a position and self-reflection on the situation in question	Each session involves addressing one of the skills that have been chosen to promote critical thinking: analyzing, evaluating, taking a position and self-reflecting on the case
History	Narrative that exposes the history of the characters	Expose the story between two teenagers, which takes up the mutual violence in the adolescent couple

Characters	Character descriptions	Represent the main characteristics of the characters, to be considered in the analysis
Evaluation	Indicators to evaluate the case	Evaluate and validate the case
Complementary material	Multimedia support and links to support institutions	Provide a series of resources that allow for a more in-depth investigation of the situation described, as well as the institutions that support it
Contact	Author's data	Contact the authors for questions or suggestions

Source: own elaboration.

The welcome area (see Figure 3) is intended to generate interest and usefulness in the students with the objective of inviting them to enter into the story, the characters and the development of the *e-case* (Farhoomand, 2004).



**Figure 3.** Welcome page of the WIX site generated on the teaching case.

Source: <https://marialuisamoralesb.wixsite.com/caso>

The activity area is distributed in six sessions, each one named according to its objective; it places special interest in the guiding questions that lead to the analysis, evaluation, taking a position, argumentation and self-reflection of the case in question.

Session one is entitled Getting into the story, its objective is to identify the characters and their narrative, as well as the central theme of the *e-case*, previous knowledge about the topic, beliefs about it, and the objective and



goals of analysis. Session two provides the basis of the topic addressed, entitled Words also kill; this topic has a transversal impact on the *e-case*. This session shows what intimate partner violence is and its main manifestations.

On the other hand, it is recognized that the didactic intervention that shows a favorable effect on the development and effective use of critical thinking and a disposition towards it is the infusion method (Abrami *et al.*, 2008; Abrami *et al.*, 2015), in which critical thinking skills are integrated into the course content and not foreign to it. Based on this, session three was designed, entitled Let's be critical thinkers and thinkers, whose objective is to elucidate what a critical thinker is, what it implies and what is required to be one.

The following sessions focus on going beyond opinion regarding the problem-situation. This involves confronting the beliefs, knowledge and frames of reference that lead to analysis and evaluation from the diversity of worldviews involved in the case study. For this reason, session four is entitled Analyzing, and session five Evaluating the situation. In this section we confront the ideals of the couple and its duty to be from the perspective of the students, in order to elucidate their conception of the couple relationship, which undoubtedly has a cultural load that it is crucial to unveil, question and self-question.

Session six leads to generating conclusions and taking a position. The purpose of this session is for students to propose endings for the story in order to confront their possible actions in a similar situation. This session invites them to put themselves in the situation and roles posed by the case, as well as to visualize that the plot implies a situation that they have lived through or that they may experience. The guiding questions for this session are shown in Table 2.

**Table 2.** Guiding questions for session six for decision-making and conclusions

Educational Intention	Guiding Questions
Generate argued positions on the situation raised	What is your position on the relationship raised in the case?
Recognize the range of possible solution proposals for the case	Write an ending to the story
Arguments in support of proposed solutions	Why did you choose the ending you have stated?
Generate self-reflection based on the situation presented	If you were in a relationship like this, what would you do?

Source: own elaboration.



The evaluation section presents the questions that allow the *e-case* to be evaluated in terms of its format, objective and usability.

### Expert validation of the *e-case* content

The validation of the *e-case* was carried out based on Tristan's model (2008), a procedure that evaluates content validity by expert judgment. In this analysis, the criteria considered were subjected to the scrutiny of eight expert judges. The dimensions were defined and ordinal scales were formed, based on the proposed *e-case* model.

The following dimensions were considered for content validation: case format, linkage with the curriculum, complexity, authenticity, openness for analysis, for evaluation, taking a position and argumentation, self-reflection and the role of the teacher. The dimensions were defined based on Wasserman (1994) and Díaz Barriga (2006).

The format developed considers the dimensions and the scores to be assigned through a Likert-type scale (1 = does not meet the criterion, 2 = low level, 3 = moderate level and 4 = high level). For the design of the validation format, Escobar and Cuervo (2008) were considered. An example of the format is shown in Table 3.

**Table 3.** Validation format of the *e-case* (fragment)

Dimension	Criteria	Does not meet the criteria	Low level	Moderate level	High level
Format of the case	The case is in narrative or story format and is well written				
	In the case there is an appropriate description of the characters and the plot, which are key to understanding the subject matter				
	The case contains a series of questions that allow for discussion and argumentation among students				
	The case contains or leads to information and data that allow us to propose a reasoned and supported				

	solution, relevant to this case				
	The case contains or leads to web sites and resources that encourage research on the topic				
	The case presents an appropriate format to address the subject matter and is original				

Source: own elaboration based on Flores (2012).

Table 4 shows the dimensions analyzed in the validation, as well as the most representative indicators. The objective and approach of the project were explained to the experts, six of them were shown the *e-case* in digital format and proceeded with the validation exercise; two of them reviewed the site and proceeded. The format for the validation consisted of three sections: identification data, instructions for the evaluation of each criterion and the evaluation exercise, as well as a section for comments and suggestions.

**Table 4.** Validation of the dimensions and criteria

Dimension	Number of indicators	Representative indicators
Case format	6	The case is in narrative or story format and is well written
Linkage to the curriculum	3	The case requires some knowledge that has been previously acquired for the resolution of the situation raised
Complexity	3	The case shows a dilemma or dilemmas to address
Authenticity	3	The case is linked to a real-life situation.
Openness for analysis	3	The case is written in such a way as to allow openness to dialogue
Openness for evaluation	3	The case considers information that allows contrasting various solutions regarding the situation raised
Openness to take a position argumentation	3	The case allows conclusions to be drawn from the facts presented
Openness to self-reflection	3	The case allows you to think about your conclusions
Rol del docente	3	In this case, the teacher is considered to make observations, promote individual activities and analysis through key questions

Source: own elaboration based on Flores (2012).

### Validation by experts of the website hosting the *e-case*

To validate the website, the following dimensions were considered: effectiveness, ease of use, bi-directionality, link sources, quality and quantity of multimedia elements, navigation, interaction, quality of the audiovisual environment, attractiveness and suitability for the target audience. The instrument of Salinas, Cabero and Aguaded (2004) was used as a basis.

The assessment was carried out through a format that considers the dimensions and criteria, as well as the scores to be assigned through a Likert-type scale (1 = does not meet the criterion, 2 = low level, 3 = moderate level and 4 = high level). The website validation format consisted of three sections: identification data, validation and comments. The objective of the project was explained, the site was shown and the validation proceeded.

### Validation with target population

The consent of the institution and of the students' parents was requested, as well as the consent of the students to participate in the implementation of the *e-case*.

We worked with them during six sessions, each lasting three hours to put into practice the proposed case methodology. The critical reading of the narrative was emphasized, as well as the resolution of the guiding questions that made it possible to analyze and evaluate the situation of the proposed relationship. In addition, the planned didactic strategies were implemented: role playing, video analysis and individual, small group and plenary work. The sessions were held in the school's computer room.

At the end of the implementation of the *e-case*, a questionnaire of eleven questions was applied in order to validate it according to the dimensions and criteria of case format, objective and usability.

## RESULTS

### Validation by experts of the *e-case* content

The CVR was obtained, which indicates the proportion of agreements by the experts at the highest level. A CVR greater than or equal to 0.58 was considered an acceptable criterion (Tristán, 2008, p. 48). The results are shown in Table 5.

**Table 5.** Results of the content validity by judging the teaching case in which the CVR was obtained

Dimention	Criteria	Agreements	CVR
Format of the case	The case is in narrative or story format and is well written	8	1.00
	In this case, there is an appropriate description of the characters and the plot, which are key to understanding the subject matter	6	0.75
	The case contains a series of questions that allow for discussion and argumentation among students	8	1.00
	The case contains or leads to information and data that allow us to propose a reasoned and supported solution, relevant to this case	8	1.00
	The case contains or leads to web sites and resources that encourage research on the topic	8	1.00
	The case presents an appropriate format to address the subject matter and is original	7	0.87
Linkage to the curriculum	The case presents a situation that relates to the curriculum and to topics seen in class	7	0.87
	The case considers the development of skills for the integration of knowledge in the solution to the situation presented	8	1.00
Complexity	The case shows a dilemma or dilemmas to consider	6	0.75
	The case shows different factors and solution perspectives associated with the problems it raises	6	0.75
	The case generates dilemmas and controversy	8	1.00
Authenticity	The case is linked to a real-life situation	7	0.87
	The case allows identification with the characters in the story or with the situations encountered	7	0.87
	The case contains a narrative that allows us to imagine the people, events or places described	8	1.00
Openness for analysis	The case is written in such a way as to allow openness to dialogue	8	1.00

	The case allows the situation to be broken down in order to address it	8	1.00
	The case contains information that allows several approaches to be taken	7	0.87
Openness for evaluation	The case considers information that allows us to contrast different solutions to the sit	6	0.75
	The case allows to compare the consequences of the possible solutions	7	0.87
	The case allows comparing the situation presented with an "ideal" or desirable situation of this situation	7	0.87
Openness to take a position argumentation	The case allows conclusions to be drawn from the facts presented	8	1.00
	The case allows us to situate ourselves in the situation described and generate various alternative solutions	8	1.00
	The case allows us to take a reasoned position on the matter and to justify it	7	0.87
Openness to self-reflection	The case allows you to think about your conclusions	8	1.00
	The case allows us to think about a position to be taken on the situation raised	6	0.75
	The case allows us to think about the arguments that support the position taken	8	1.00
Teacher's role	In this case, the teacher is considered to make observations, promote individual activities and analysis through key questions	8	1.00
	In this case, it is considered that the teacher encourages study, analysis and group discussion activities	8	1.00
	In the case, it is considered that the professor will comment and give feedback in plenary on the process of analyzing the case	7	0.87

Source: own elaboration.

The results obtained through the CVR as a whole are favorable with respect to the level of agreement obtained by the judges. All nine dimensions have achieved a CVR greater than 0.58, which indicates that each of the criteria

considered fulfills its purpose. Of note are the dimensions that study openness to analysis, evaluation, taking a position and self-reflection, which were designed under the framework of critical thinking, the central interest of this case, and which were validated in a satisfactory manner.

In the suggestions section, some improvements were proposed and considered. In the case format dimension, the description of the characters and the story was modified, and it was also proposed to include a greater number of details on the interaction of the protagonists. In the complexity dimension, a greater deepening of the narrative in terms of social and cultural factors was considered, including relationships with family and friends that imply a greater understanding of the dilemma.

Changes make it possible to deepen the analysis and evaluation of the central situation, based on the diversity of contextual, social and personal factors involved, in order to contrast the various possibilities of study and critical understanding of the manifestations of violence in adolescent couples. Likewise, it is evident that the validation shows the potentialities in terms of improvement for the benefit of the objective of the design and approach of the case.

#### Validation by experts of the web site hosting the *e-case*

The results were subjected to a content validity analysis by expert judgment considering Tristan's (2008) CVR (see Table 6). The ten dimensions of this validation obtained a CVR greater than 0.58.

**Table 6.** Results of the content validity by judging the teaching case website in which the CVR was obtained

Dimension	Criteria	Agreements	CVR
Efficiency	The site is designed and structured in accordance with the purpose for which it is intended	8	1.00
Ease of use	The site is intuitive to navigate and, therefore, easy to use. Users have no difficulty in locating the information they need, nor in locating where they are	7	0.87
Bidirectionality	The site allows users not only to be passive receivers of information, but also to be senders of information	7	0.87
Multiple link sources	The site includes hypertextuality, which increases the educational and informative capacity of the web and search resources. The site includes hypertextuality, which increases the educational	8	1.00

	and informative capacity of the web and search resources		
Quality and quantity of multimedia elements	The site contains multimedia elements, such as images, videos, infographics, audio, among others, which present technical and aesthetic quality, and a specific purpose of the site	8	1.00
Navigation	The site has elements that allow you to learn how to navigate within the site	7	0.87
Interaction	The site has a section: Contact the author, which allows you to manage your questions or doubts	8	1.00
Quality of the audiovisual environment	The site has a high quality audiovisual environment in relation to the backgrounds, typography and distribution of multimedia elements	8	1.00
Attractive	The site is attractive and motivating to maintain the interest and curiosity of cybernauts	8	1.00
Adequacy to the target audience	The site is designed considering the characteristics in relation to the capabilities, interests and needs of the target users	8	1.00

Source: own elaboration.

The results obtained provide content validity by experts, which indicates that the website is designed and structured with the purpose it pursues, in addition to having an attractive and quality audiovisual environment that considers the characteristics of the target users.

Likewise, relevant suggestions were made that led to modifying the navigation route and signage, adding more informative links and linking websites of some institutions that provide support in situations of intimate partner violence.

### Validation of the teaching case with the target population

The case evaluation section shows a series of dichotomous questions to the participants regarding the format, objective and usability of the *e-case*. The results were subjected to a content validity analysis by the student body based on Tristan's (2008) CVR (see Table 7).



**Table 7.** Validity results with students: case format, objective and usability by obtaining the CVR

Dimension	Criteria	Agreements	CVR
Case format	In the case there are appropriate descriptions of the characters and the plot that allow me to understand the subject matter	15	1.00
	The case contains a series of questions that allow me to discuss and argue the case	15	1.00
	The case contains activities that allow me to propose a reasoned and supported solution	13	0.86
Case objective	The case allows me to break down the situation for analysis	14	0.93
	Does the case allow me to compare the consequences of possible solutions?	15	1.00
	The case allows me to situate myself in the situation described and to generate several alternative solutions	15	1.00
	Does the case allow me to compare the consequences of possible solutions?	13	0.86
	Does the case allow me to think about the arguments that support my position?		
Usabilidad del caso	The site is intuitive in its navigation and allows me to use it easily	15	1.00
	I find the site attractive and motivating, it manages to keep my interest and curiosity	15	1.00
	I find the site attractive and motivating, it manages to keep my interest and curiosity	15	1.00

Source: own elaboration.

The students developed the activities proposed for these six sessions and at the end answered the questionnaire referring to the format, objective and usability of the *e-case*. All the indicators obtained a CVR higher than 0.58, which shows that the students consider that the *e-case* fulfills the objective for which it was developed; that is, it has questions that have allowed them to discuss and argue. Likewise, it favored their identification with the situation narrated, generating solution alternatives and taking a position. They also point out that it is a site that was easy to use and motivating to maintain their interest and curiosity.

Finally, from the validation with the target population, areas for improvement have been identified, in terms of more understandable language and adjusted to the way in which adolescents communicate, which brings greater authenticity to the story. The adolescents' indications and suggestions made it possible to adjust not only the language, but also the situations presented in the case and to better delineate the protagonists and their context of interaction.

## DISCUSSION

In this article we have tried to show the process of creation and validation of an *e-case*, focused on the analysis of critical thinking in high school students on the topic of violence in the adolescent couple. According to authors such as Naumes and Naumes (2015), the validation phase is paramount; however, it is absent in the teaching cases of the sites and university reviewed, for this reason it is a great contribution.

In methodological terms, in addition to showing the technopedagogical design process of an *e-case*, a validation strategy using experts, based on indicators, is also contributed. In this sense, it is of singular importance to validate a design such as the one proposed both with experts and with the target population, in order to clarify its relevance, the validity of the knowledge presented and the appropriateness of the approach, as well as to identify successes and areas for improvement in all the components of the pedagogical device created.

In general, it can be affirmed that the validation with experts and students of the target population of the proposed *e-case* yielded favorable and coinciding results with respect to the content, didactic treatment and design of the web site. The aspects to be improved in the didactic treatment, navigation and monitoring of the *e-case* were identified in order to enhance its educational effectiveness in terms of the expected learning from the critical thinking approach.

In this society, which is becoming increasingly technological, the use and training in ICT is becoming essential in all professional sectors, and also among teachers and students; this is why they are still considered as the drivers of change and innovation in the classroom (Álvarez, 2020). Of course, they are not everything, nor the only thing, however, they are central axes that can support the development of pedagogical models that promote processes of analysis and construction of knowledge instead of its mere reproduction, which generates critical perspectives and an approach to realities and topics such as the one presented here.

The changes currently taking place in the educational field -where there is a migration from the face-to-face to the virtual or hybrid- imply the opening and incorporation of methods and technologies in the work of teachers and students (López and Chacón, 2020, p. 36), who are

transformed and adjusted to the dynamics of a present highly permeated by the possibilities of the digital era.

The generation of strategies mediated by technologies, such as *e-cases*, are a great success, as mentioned by Conde and Boza (2019, p. 100), since the student model of the future is portrayed as constructive and transformer of digital information, capable of deciding and intervening on reality through questioning, projects, innovations, among other ways, which makes them critical thinkers who go beyond unique and irrefutable truths and solutions.

One of the limitations of this study is that, being situated, it provides guidelines to be taken up by those who wish to generate similar strategies. We warn that the case will have to be adapted according to the characteristics of the target population with which we work and the subject matter analyzed; however, this can be taken as an opportunity to create and co-create a wide range of *e-cases* with diverse target populations and subjects.

## CONCLUSIONS

The validation process conducted allowed for a more situated didactic study that led to ensuring quality control of the instructional design of the *e-case*, its content and ecological validity, as well as giving evidence-based design and validation guidelines for those wishing to engage in this strategy. In the process reported in this article, it was possible to adjust the narrative, characters, activities, questions, and resources to be used. This allowed us to make reasonable adjustments to a didactic design appropriate for the target population with whom we worked.

Validity through experts and target population is considered of great importance as a methodological resource to ensure the usefulness of the content and didactic design of an instructional model and of a technopedagogical design, in order to ensure its relevance, consistency and rigor of its educational support.

In the same line, the potential of the case methodology is recognized, which involves the main actors (teachers and students) to enhance learning, creativity and criticality through virtual or hybrid environments that recognize and give voice to these actors in situated contexts, which provides the possibility to debate, argue, take a position, and even disagree with due support.

This *e-case* opens the possibility of extending its instrumentation with different target populations, where the necessary adjustments can be made to enable the contrast and analysis of the different ways of approaching and developing the case, which will contribute not only to the

theories of critical thinking or to the issue of violence, but also to the use of technologies in these strategies.

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